



*Michael C. Schlachter, CFA  
Managing Director & Principal*

January 30, 2008

Dr. Russell Read  
Chief Investment Officer  
California Public Employees' Retirement System  
400 P Street, Suite 3492  
Sacramento, CA 95814

Re: Internal Currency Management

Dear Russell,

Wilshire has conducted our annual review of the internal currency team's personnel, investment process, and resources. This review was conducted as part of Wilshire's contractual requirement to periodically review all of the internal asset management functions, and included an on-site visit in December 2007. Overall, we are pleased with the quality of the personnel, systems, and processes, and believe that the Investment Committee should continue to support this internal team.

There are three functions provided by the internal currency team, and this letter will serve as our review of each. We have also included a multi-page table at the end of this review which is similar to what we would complete for an external manager, detailing our opinion on specific aspects of the currency program.

It is important to bear in mind that the majority of the internal currency team's responsibilities are only an execution capacity at the present time, focusing more on managing the passive hedge and executing foreign currency transactions for other areas within CalPERS than actively managing assets. To implement the hedge ratio, Staff leverages its relationships with dealers and external managers to survey the best of breed models and then develop them in house. Strategies can be broken into four components 1) Fundamental 2) Carry 3) Technical and 4) Volatility. Staff has been given discretion to vary the hedge ratio plus or minus 5 percentage points from the target hedge ratio of 25%. The committee consisting of the Chief Investment Officer (CIO), the Senior Investment Officer Fixed Income (SIO), the SIO of Asset Allocation, the Senior Portfolio Manager Fixed Income and the Portfolio Manager of Currency, and Portfolio Manager International Research and met several times during 2007. In September 2007 a decision was made to reduce the hedge ratio by 1 % as soon as practical with an additional 1% should specific market parameters be fulfilled. The 1% reduction was implemented on September 21, 2007 and has added approximately 300 bps of value.

In April 2007, Staff launched an actively managed pilot program for a currency overlay account, and has had measurable success to date. We recommend continuing to monitor and grow this pilot program to see if it may become another source of value added for the overall CalPERS portfolio.

### **Summary of Conclusions**

As will be outlined in the sections that follow, we believe that the Passive Currency Overlay portfolio is being managed in a cost-effective manner and in a way that is consistent with the direction from the Investment Committee. We also found that Staff has been able to add value through the internal execution of foreign exchange transactions for other asset classes, and should be encouraged to continue to execute such transactions wherever possible. Finally, we also reviewed CalPERS' policies that apply to these portfolios, and we believe that the team and portfolios are in compliance.

### **Passive Currency Overlay**

CalPERS' internal currency team provides a currency overlay to partially hedge the foreign currency exposure in the portfolio. The Investment Committee has determined that the proper hedge ratio is 25% of foreign exposure, but allows the internal team, together with a committee of several other senior members of the Investment Office, to vary the hedge ratio by +/- 5% based on their prediction of future exchange rate movements based on current market and economic fundamentals. Such models are discussed below in the section that deals with the proposed alpha-generating strategies.

The appropriate hedge ratio in light of the new asset allocation was raised as an issue for the Investment Committee to discuss at the January off-site, and will continue to be discussed at Investment Committee meetings over the next several months. We are confident that Staff will be able to continue to internally execute the transactions necessary to implement the new hedge ratio, regardless of the new target.

As part of our review, we witnessed a demonstration of how CalPERS' Staff calculates CalPERS' currency exposure, calculates the required hedge amounts, solicits bids from third-party commercial banks and investment banks, selects counter-parties, executes trades, and reviews results. We also discussed with Staff any future improvements that they may have for the investment process and the investment philosophy that will underlie any future fluctuation from the target hedge ratio, as allowed by the Investment Committee.

In short, we believe Staff has sufficient resources at its disposal, including a custom-designed (by an external third-party) currency management and trading platform, to achieve the program's goals. Furthermore, we believe Staff has exhibited a high degree of diligence to reduce transactions costs and achieve best execution. Given that Staff selected the trading and management platform in a competitive process, which resulted in

full customization of all software to CalPERS' specific needs, we believe that Staff is using high quality technology systems that are appropriate for the currency team's operations. Additionally, we believe that Staff is soliciting bids from a sufficiently wide array of counterparties to ensure that all CalPERS currency trades are executed without significant market impact or transaction costs. Staff currently solicits bids from 18 currency dealers, and has the technological capacity to expand this number if Staff believes that other dealers should be included in their process. Our review of the list of dealers indicated that many of the top banks and brokers are working with CalPERS' team, or could be added to CalPERS' trading platform in the event that their costs and execution become competitive with the current list of available counterparties.

Our review revealed that Staff is clearly committed to distributing its trades among a wide variety of counterparties, and is careful not to execute all of its transactions through a small number of dealers, thereby maximizing the amount of liquidity available to CalPERS. At first, this seemed counter-intuitive to us. After all, if one dealer is willing to consistently offer lower fees or better execution, it would make sense that the dealer should win the lion's share of CalPERS' currency trades. However, as Staff explained to us, the danger in such a scenario is that PERS will become too dependent on a single dealer, and may fail to maintain a broad relationship base with other dealers. In the event that the main counterparty became less competitive in the future, Staff may find that it is unable to change to another dealer.

Instead, Staff rewards the better bidders with larger trades and more trades, and reserves smaller trades for less competitive bidders, while making sure that all trades are well-distributed across all 18 dealers. Staff also directly provides feedback to dealers who are less successful in winning a sizeable share of CalPERS' business in an effort to encourage them to bid more aggressively in the future. We believe that this concerted effort to include all dealers and provide feedback to the dealers will help to prevent Staff from being held "hostage" in the future by a single dealer who becomes less competitive, will help provide ongoing liquidity for CalPERS' internal currency transactions, and will help to continue to reduce transactions costs over time. Additionally Staff have leveraged CalPERS unique position within the marketplace and worked with external dealers and asset managers to develop their models used in the active programs.

As a result of this review, we continue to be confident in the ability of CalPERS' Staff to execute the passive currency hedge program in a cost-effective manner.

### **Internal Spot Currency Execution**

CalPERS conducts a large number of foreign currency transactions when making investments overseas, especially in the new Cash Equitization Program (where cash holdings gain international equity like exposures through the use of futures), Real Estate and AIM programs. In years past, the execution of foreign exchange transactions from

CalPERS' US dollar cash positions to the currency of the acquired asset were handled by third parties. A few years ago, CalPERS' internal currency Staff began offering its services to other asset classes to minimize execution costs. Today, internal currency team Staff handle all foreign currency transactions required by other sections of the CalPERS investment office either through their trading platform or through direct contact with individual banks. As a result, as part of our review, we also discussed this internal function and its effectiveness.

We believe that CalPERS has sufficient expertise to conduct the current volume of foreign exchange transactions required by other asset class SIOs, and would encourage all CalPERS Staff to conduct all foreign exchange possible through the internal team. However, to execute a greater share of transactions via the in-house platform, we believe that an expansion of the team may be in order. Such an expansion of the team may result in reduced costs to the overall CalPERS portfolio by improving all currency execution.

Our rationale for this recommendation are simple – execution and costs. In the first 8 months of 2007, for the Cash Equitization Portfolio, \$930 million worth of currency transactions executed by Staff on their currency platform were conducted at an average rate 0.017% *better* than the WM fix, (a close match to the time of execution, 8 AM Pacific time. This represents a gain of \$158,000). In contrast, \$11.2 billion worth of transactions executed through external commercial banks over that time period on average *cost* CalPERS 0.005% relative to the average rate for that day (a loss of \$560,000). An expansion of the resources allocated to the internal team should allow CalPERS to expand the amount of currency transactions executed on the internal platform, and, as demonstrated through the team's track record, improve execution and transactions costs.

Wilshire believes that the differences in cost and execution effectiveness between the in-house platform and the external banks are a result of incentives. Third-parties, like banks, are rewarded on the basis of transaction volume, and have a substantial incentive to execute as many client transactions as possible, regardless of cost or market impact. Since most currency transactions by other asset classes are periodic activities, there is no mechanism in place for them to effectively reward or punish counterparties for good or bad execution.

In contrast, CalPERS' internal currency team is rewarded for minimizing cost on every trade and for adding value to the total fund. With sufficient notice (usually at least a few days), Staff can wait for the right market conditions to effect transactions with as little market impact as possible. As a result, Staff will usually parcel out a trade for as long as possible, seeking to capitalize on periodic fluctuations in exchange rates. Instead of just jumping into the market, pushing prices up or down, or accepting whatever current price is offered by a bank, Staff will usually slowly trade even smaller transactions over a period of days, seeking to outperform the average exchange rate over the period. While this may occasionally result in a higher cost on the few trades in which the currency's

price is moving rapidly, over time this type of slow and patient approach should result in reduced transaction costs, reduced market impact, and superior pricing than reliance on a third-party who is compensated on the basis of trade volume.

As a result of both the logical benefits of slow and careful trading, as well as the demonstrated value-added in spot transactions by the currency team, we believe that Staff has demonstrated the ability to execute spot market transactions on behalf of other asset classes in a superior manner to third-parties, and we encourage CalPERS to take advantage of this internal function wherever possible.

### **Active Currency Management**

Over the last several years, Wilshire has met with Staff on multiple occasions to review Staff's plans for internal active management of currency as a way to add value to the total fund. A primary cause of this profit potential is the inherent inefficiencies in the currency market due to the existence of non-profit-maximizing investors such as central banks and large multi-national corporations seeking to hedge exposure. To the extent that a profit-maximizing investor can recognize when the market is being driven by such non-profit-seeking players, investment gains can be made over time.

Staff's philosophy is to exploit these inefficiencies in the currency marketplace BEFORE they are fully priced in by the currency markets. To do so, four interrelated strategies have been developed and implemented. These models are:

- 1) Technical models – perhaps presently the most efficient behavioral models and provide a constant feedback of pricing.
- 2) Carry models – to calculate the cost or benefit of holding a position.
- 3) Fundamental models – to monitor the economic factors that underlie international payment transfers.
- 4) Volatility models – help determine the environment with respect to risk factors.

The above 4 categorizations interact. For example, Carry trades work best in low volatility environments. Low volatility can result from stable fundamentals. Technical models monitor prices and can be an indication of a stale trend and potent increased volatility.

As noted, Staff have leveraged CalPERS unique position within the marketplace and worked with external dealers and asset managers to develop models. External counterparties realize the benefit of having a major player like CalPERS being an active proponent of currency management and have provided valuable insights. Using this methodology Staff remains abreast of current developments in the currency market.

To be clear, we do not believe that there is an inherent return from simply investing in currency, as there should be in a long-term investment in equities, fixed income, real estate, or a number of other assets. While we expect stocks, real estate, and private equity to generally increase in value over the next decade, and we expect fixed income to generate yield to investors, we do not see an economic reason why the New Zealand Dollar, for example, should consistently add or lose value relative to the Japanese Yen over that same time frame. Instead, we believe that volatility in interest rates and exchange rates provides an opportunity for profit-maximizing investors to realize trading profits over time.

In its first 8 months of existence, the \$100 million internal active currency overlay pilot program has been able to add value, and we believe that this program should be continued in hopes of demonstrating both the value in active currency management as well as Staff's ability to manage a full-size program in the future.

### **Risk Factors**

CalPERS' currency efforts face a variety of risks. Most of these risks are currency-specific and are well known – volatility, liquidity, etc. Wilshire believes that Staff is monitoring these risks appropriately and has ameliorated many of the currency-specific risks in the portfolio.

However, two of the risks are CalPERS-specific. First, CalPERS has invested in systems and technology to provide the currency team with state of the art tools. However, this should not be viewed as a one-time investment. These tools and systems need to be maintained and upgraded as necessary so that the currency team does not face a competitive disadvantage versus other currency investors. Since currency investing in total is a zero sum game, CalPERS must work to keep its tools and systems up to date. At the present time, we believe that all such systems are current, but it is incumbent upon Staff to monitor the progression of industry technology and upgrade as necessary.

Second, CalPERS, as a governmental organization, faces some organizational risks that for-profit enterprises do not face. For example, non-governmental organizations can induce key employees to stay with the firm by offering ownership in the enterprise. CalPERS cannot match this economic incentive and is more at-risk for losing intellectual capital than a for-profit enterprise would be. This is an ongoing risk for the entire CalPERS organization but is especially meaningful in the currency team given its small size.

### **Conclusion**

In brief, we believe that Staff has demonstrated the ability to both implement the passive currency hedge and to execute cost-effective spot transactions. In addition, we

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recommend that you encourage the Staff to continue to explore their theories on the value of currency active management as a precursor for a full-scale internal program that may add value to the total portfolio.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael Schlachter", with a long horizontal flourish extending to the right.

Michael C. Schlachter, CFA  
Managing Director & Principal

## Strategy Evaluation: CalPERS Internal Passive Currency Overlay Strategy

### **Organization (0-100)**

#### **SCORE:**

Ownership/Incentives (0-30)  
    Direct Ownership/Phantom Stock  
    Profit Sharing  
    Performance Bonus  
    Depth of Incentives

Score: 5

Team (0-25)  
    Communication  
Role of Manager, Research, and Operations  
    Longevity of Team

Score: 20

Quality of Key Professionals (0-15)  
    Experience  
    Quality of Leadership  
    Quality of Education

Score: 15

#### **COMMENTS:**

Employees receive performance bonus only.

Team currently is appropriate given size of operation and portfolio, although expansion may be in order to facilitate greater in-house execution of currency transactions for other asset classes. There is a lead portfolio manager and two secondary portfolio managers, all of whom are dedicated to currency and international fixed income management. The team members have back-ups from others on the currency team and elsewhere in the trading room. There is also back-up from outside the fixed income unit as members of the equity unit currently handle their own currency trading for the execution of trades for the international equity index on a parallel system. Members of the team have been together for several years. Communication links are informal and proximity of team members is close.

Education and technical skill set of portfolio managers and SIO-Fixed Income are exceptionally good, by any standard. The portfolio managers and back-ups have traded currencies before with previous employers and between them have more than 40 years of experience. Leadership skill of SIO-Fixed Income is very good and his tenure with CalPERS is the longest of the senior investment staff. This individual has had more than 20 years of internal asset management at CalPERS. Understands risks and issues to be monitored or resolved regarding strategy. Appropriately concerned about process, reporting, and monitoring.



Turnover of Senior Professionals (0-15)  
Low (<10%), Medium (<20%), High (>20%)

Score: 5

Staff turnover for CalPERS is high at both the senior and junior levels, including the departure of 2 CIOs in the last several years. Lack of long-term retention incentives lead some staff to consider the organization as a “stepping stone” to better compensation in similar positions elsewhere. Turnover for this strategy is a risk. However, there is excellent back-up with three fully-trained portfolio managers assigned to the strategy, now located in a unit with the longest tenure of internal asset management at CalPERS.

Commitment to Improvement (0-15)  
Clear Mission  
Re-investment  
Process Enhance

Score: 15

Strategy has clear mission and objectives. Resources are sufficient to the current tasks assigned to team, and support exists within the organization to add staff or other resources if strategy expands or other demands warrant.

### **Philosophy/Process (0-100)**

#### **SCORE:**

#### **COMMENTS:**

Market Anomaly/Inefficiency (0-40)  
Permanent or Temporary  
Clear Identification  
Where and How Add Value  
Empirical or Academic Evidence to Support

Score: 40

The strategy employs a passive overlay approach whose primary objective is to minimize tracking error versus the benchmark. Actual trading results have proven the efficiency of the team and the cost reductions possible.

“Value-added” has also been achieved relative to the average transaction price for currency exchange conducted on an agency basis for other asset classes.

Highest score given as this is a passive portfolio that has met or exceeded its mandate.

A pilot active strategy has been launched, and has been successful to date, but this is a secondary consideration for the team at this time.

Information (0-15)  
Unique Sources, Unique Processing

Score: 15

Information sources a function of market forces and the selection of dealers for minimizing trading costs. Trade monitoring has allowed for evaluation of the pool of dealers selected for program and proof of concept that internal trading can demonstrate better execution and lower costs than third parties.

Highest score given as this is a passive portfolio that has met or exceeded its mandate. A pilot active strategy has been launched, and has been successful to date, but this is a secondary consideration for the team at this time.

Buy/Sell Discipline (0-15)  
Disciplined/Structured Process  
Quantitative and Qualitative Inputs

Score: 15

Portfolio Construction (0-15)  
Benchmark Orientation  
Risk Controls  
Ongoing Monitoring

Score: 15

Quality Control (0-15)  
Return Dispersion  
Performance Attribution  
Performance Consistency  
Style Drift

Score: 15

Buy/sell discipline based solely on underlying index fund portfolio currency exposures and portfolio managers' knowledge of market factors on day of trade. Controlling trading costs during portfolio re-balancing is key and has been clearly demonstrated.

Portfolio construction techniques and monitoring are very good with internally developed and maintained systems. There is a separate monitoring function within the Fixed Income Unit to review this strategy and report separately to the SIO-fixed income. The Strategy has the appropriate policies and procedures on a documented basis in place and a "checklist system" to ensure compliance.

The process has tight risk controls built in, and is independently-monitored within the Unit through a separate reporting line to the SIO-Fixed Income. Within the portfolio management team there is good separation of responsibilities as well as back-up and cross-checks. Further, trade settlement and back-office support is separate from portfolio management. Wilshire has reviewed and had input into the drafting of the procedures manual that covers portfolio management, trading operations systems operations and monitoring. It is very thorough and has been independently reviewed by the SIO-Equity, the SIO-Fixed Income and other CalPERS' investment Staff. The resulting tracking error from the portfolio results has been extremely tight.

**Resources (0-100)**

**SCORE:**

**COMMENTS:**

Research (Alpha Generation) (0-40)

Appropriate for Product Style  
Conducted Internally/Externally  
Quantitative/Qualitative  
Sufficient Databases and Models for  
Research  
How are Research Capabilities Enhanced

Score: 38

Research has been conducted internally in accordance with accepted principles for passive currency management. The majority of research has centered in the development of the appropriate systems and trading execution. These have been more than adequately accomplished. Databases of currency movements and prices obtained from outside sources are available to Staff. Current market information is obtained from several counter-parties. Counter-party credit analysis conducted internally by CalPERS' research staff. Counter-party research should continue to be ongoing to ensure the best counter-parties as their capabilities change over time. Staff's leverage of dealers and asset manager research is yielding encouraging results as noted by the early success of the Active Portfolio and the Tactical Management Portfolio.

Information/Systems Management (0-15)

Ability to Manage Large Flows of Data  
Appropriate Systems for Research and  
Management

Score: 15

Hardware and software support is strong. Currency trading and portfolio management tools were custom-designed to CalPERS' specifications by an external vendor.

The entire industry is grappling with appropriate trading cost execution measurement for currency trading. Staff should remain abreast of developments in these areas and CalPERS should continue to be willing to make the necessary systems investment in this area. This strategy is capable of handling a large volume of assets, with trading costs being the only impediment. Staff has demonstrated an appropriate management of costs and has been able to handle billions of dollars in transactions with existing systems.

Marketing/Administration/Client Service (0-15)

Dedicated and Knowledgeable Group  
Quality of Materials/Presentations of RFPs  
Responsiveness  
Measuring Client Satisfaction

Score: 14

Since marketing and client service are not involved, unlike external sources for such a strategy, full resources of portfolio managers will be devoted to CalPERS, as the portfolio managers will not have to travel to service other clients or market to prospects. End client (Investment Committee) has regular meetings that usually require SIO and Portfolio Manager, but team is able to continue to operate in their absence.

Trading (0-30)

Turnover Relative to Process  
Sophistication of Trading Process  
Measurement of Trading Costs  
Soft Dollars in Client Interest

Score: 25

CalPERS' trading room is very sophisticated, was constructed in the last few years, and has subscriptions to all of the most popular trading resources, i.e. Bloomberg, Instinet, ITG, WM, etc. Soft dollars will be used on an on-going basis for data feeds only and their use has been highly acceptable. Relative to the potential assets to be managed the soft dollar use will be quite small. Since the underpinning of this strategy lies in the trading, there have been no significant trading issues that should impact the execution of the strategy. There is sufficient back-up and separation of responsibilities in the trading function. There is ex-post review of trading execution, but as with all trading reviews it can be improved.

***Discussion***

Wilshire's score on this strategy of 84% or 252 out of 300 possible points reflects the strong team and clear success demonstrated at managing the portfolio as charged. This is the same score that resulted from our March 2006 review, and is an improvement from the 77% score (230 points) that Wilshire provided when the strategy was proposed and managed only in "paper" form. The main reasons for a less-than-perfect score overall are largely due to organizational-level issues such as senior management turnover and lack of long-term retention incentives.